

## A NEW *JANUS* (HYMENOPTERA: CEPHIDAE) FROM *QUERCUS*, AND KEY TO NORTH AMERICAN SPECIES<sup>1</sup>

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**ABSTRACT:** *Janus quercusae*, new species, from Mississippi, Maryland, and Virginia is described and illustrated. The larvae bore and feed in young shoots of *Quercus nuttallii*. Biological notes are presented, and a key to the five North American species of *Janus* is given to separate the species.

Larvae of species of *Janus* bore and feed in young stems of trees and shrubs. *Janus abbreviatus* (Say) is associated with *Populus* and *Salix*. *J. bimaculatus* with *Viburnum*, *J. integer* with *Ribes* (Smith, 1978), and *J. rufiventris* with *Quercus* (Hanson, 1986). *Janus abbreviatus* is a pest in nurseries (Solomon and Randall, 1978). In 1983 the junior author discovered larvae of a species of *Janus* in young stems of *Quercus* in Mississippi. A single adult emerged from the infested shoots in 1984, and a second adult was reared from infested *Quercus* stems in 1987. Although only four adult specimens are known, the two reared specimens and additional ones from Maryland and Virginia, significant features distinguish them from other North American *Janus* and this species is described here.

### *Janus quercusae* Smith, new species

Figs. 5, 11

**Female.** — Length, 6.5-7.0 mm. Antenna black. Head black; mandible and palpi yellow. Thorax black with narrow posterior margin of pronotum, tegula, and short stripe on lower posterior margin of mesepisternum yellow. Abdomen with basal plates and anterior half of 2nd segment black, posterior half of 2nd segment, segments 3-6 and laterally on 7 red, dorsal and ventral portion of 7th segment and segments 8 to apex and sheath black; cercus yellow. Fore- and midlegs yellow; most of anterior surface of hindcoxa black, posterior surface and apex yellow; hindtrochanter yellow; hindfemur orange, basal 1/4-1/3 hindtibia yellow with apical 3/4-2/3 orange; hindtarsus brownish. Wings hyaline, costa and most of stigma ochre, apex of costa and veins brownish. Hindtibia with 2 preapical spurs. Hindbasitarsus shorter than remaining tarsal segments combined (as 2.2:3.0). Forewing with radial vein complete. Lancet as in Fig. 5, serrulae concave at apex, with two rounded teeth and indentation on each side of serrulae about same depth.

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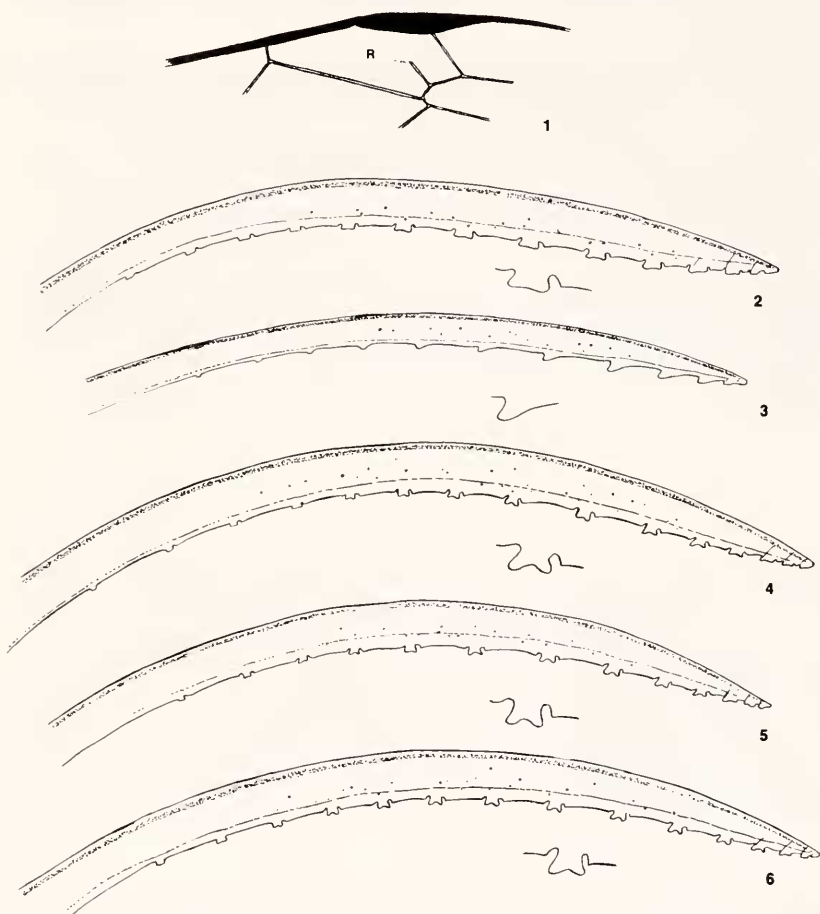
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Male — Unknown.

**Holotype** — ♀, Leland, Washington Co., Mississippi, Nuttall oak (*Quercus nuttallii* Palmer), stems collected 6-27-83, adult April 1984, J.D. Solomon, No. 27.

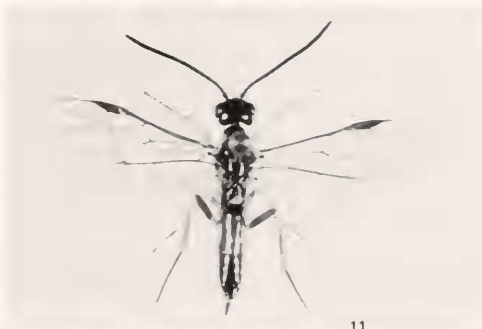
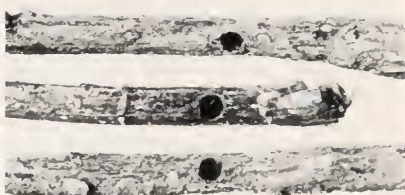
**Paratypes** — **MARYLAND**: Patuxent Wildlife Refuge, Prince Georges Co., V-II-86, Malaise trap, D. Wahl (1 ♀). **MISSISSIPPI**. Same locality and host as holotype, stems collected April 7, 1987, adult emerged April 16, 1987 (1 ♀). **VIRGINIA**: Louisa Co., 4 mi. S. Cuckoo, V-19-26-1988, Malaise trap, J. Kloke & D.R. Smith. (1 ♀) Holotype and paratypes from



Figs. 1-6. 1, Antero-central portion of forewing of *Janus abbreviatus*. 2-6, Lancets. 2, *J. abbreviatus*. 3, *J. bimaculatus*. 4, *J. integer*. 5, *J. quercusae*. 6, *J. rufiventris*.

Maryland and Virginia in the National Museum of Natural History, Washington, D.C. Other paratype in the Southern Hardwoods Laboratory collection, Stoneville, Mississippi.

Host. — Injured stems have been observed on about two dozen trees in Mississippi, all Nuttall oak, *Quercus nuttallii*. They were not found on other *Quercus* species growing in the



Figs. 7-11. *Janus quercusae*. 7. Flagging shoot on *Q. nuttallii*. 8. Flagging shoot laterals, shoot tip already girdled and broken away. 9. Points of shoot girdling by larvae. 10. Adult exit holes in shoots. 11. Female. (Photographs by J.D. Solomon)

same area. Other oak species possibly of the red oak lineage may serve as hosts since the species is known from Maryland and Virginia which is well beyond the range of *Q. nuttallii*.

**Biological notes** — Flagging shoots of Nuttall oak (Fig. 7) were first observed in June, 1983, in Leland, Mississippi. A sample of infested stems was collected on June 27, and a single stem-boring sawfly larva was discovered in a gallery in each shoot. On this date, all the sample larvae had completed their feeding and were inside transparent cellophane-like cocoons within the galleries. Infested stems held in the laboratory failed to produce adults in 1983, but a single dead adult was found in the container in April, 1984. Infestations have been scarce since 1983. A small sample of injured branch ends collected on April 7, 1987, produced one adult on April 16, 1987. Mid- to late April appears to be the time of natural adult emergence in Mississippi since the earliest evidence of wilting and drooping oak stems was observed on April 19. Stem dieback begins in early May. Flagged shoots, although uncommon, have been most noticeable from about mid-May to mid-June. Soon afterward, the outer portions of flagged shoots break away (Fig. 8), leaving little evidence of infestation. Points of shoot girdling by larvae and adult exit holes are shown in Figs. 9, 10. Sawfly-injured stems have been observed only on young trees 2-12 m in height. There appears to be one generation a year.

## DISCUSSION

*Janus quercusae* is probably most closely related to *J. rufiventris*. Both species attack oaks and both have structurally similar female lancets. The host of *J. rufiventris*, however, is *Quercus garryana* Douglas, a member of the white oak lineage (Hanson, 1986). The North American species of *Janus* are distinguished in the following key:

1. Forewing with two round black spots, one in cell 3Rs and one in cell 3M (base of vein R atrophied in ♂ (Fig. 1), complete in ♀; hindtibia with 2 preapical spurs) (Que., Ont. south to Va. west to Minn., 111.) (lancet as in Fig. 3).....*bimaculatus* (Norton) 2
2. Forewing with one black spot below stigma (base of vein R complete; hindtibia with 2 preapical spurs) (Newf., Que. south to Va. west to B.C., Wash., Oreg., Iowa) (lancet as in Fig. 4) .....*integer* (Norton)  
Forewing hyaline, without fuscous spots or only somewhat infuscated toward apex or along veins ..... 3
3. Hindtibia with one preapical spur; forewing may be lightly infuscated near apex and along veins; abdomen entirely red (vein R of forewing complete) (Calif., Oreg.) (lancet as in Fig. 6).....*rufiventris* (Cresson)  
Hindtibia with 2 preapical spurs; wings hyaline; abdomen with red band at center or near base, black at base and apex ..... 4

4. Base of vein R of forewing atrophied near stigma (Fig. 1); abdomen of female with red band near base, only segments 2-3 and part of 4 red; hindcoxa orange; apical 2/3-3/4 hindtibia and entire hindtarsus black in female; hindbasitarsus only slightly shorter than remaining tarsal segments combined, as 3.0:3.3 (N.S., Que., Ont. south to Va., Miss. west to Alta., Oreg.) (lancet as in Fig. 2).....*abbreviatus* (Say)  
 Vein R of forewing complete, joined to stigma; at least segments 3-6 of abdomen red; hindcoxa mostly black on anterior surface; apical 2/3-3/4 hindtibia orange; hindtarsus brownish; hindbasitarsus about 2/3 length of remaining tarsal segments combined, as 2.2:3.0 (Md., Miss., Va.) (lancet as in Fig. 5) (male unknown)....*quercusae*, new species.

The hyaline wings and coloration of the body of *J. quercusae* are most similar to *J. abbreviatus*, thus it is most likely to be confused with that species. The features in the above key will separate the two, especially the complete vein R of the forewing in *J. quercusae*. The hindbasitarsus of *J. rufiventris* and *J. quercusae* are only about 2/3 the length of the remaining tarsal segments combined, whereas that of other species are only slightly shorter.

Two species from the Palearctic Region are known to feed on *Quercus*, *J. femoratus* (Curtis) of Europe and *J. kashivorus* Yano and Sato from Japan. Both differ in color from *J. quercusae*, especially in having an entirely black abdomen, and *J. kashivorus* has only one preapical spur on the hindtibia.

The lancets of all five North American species are illustrated here for the first time (Figs. 2-6). That of *J. bimaculatus* differs from the other four by the single-toothed serrulae; all others have double-toothed serrulae. The serrulae of *J. abbreviatus* are more truncate at their apices and do not appear distinctly double-toothed. The indentation posterior to the serrulae is deeper than the anterior indentation in *J. integer*, whereas each indentation is approximately the same depth in *J. rufiventris* and *J. quercusae*.

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